

South Dakota Gestational Diabetes Care Guidelines



Developed by the South Dakota Department of Health Diabetes Prevention and Control Program in cooperation with the Centers for Disease Control and Prevention, and adapted from the New Hampshire Diabetes Prevention and Control Program Care Guidelines.



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Contents

- ❖ Screening
- ❖ Diagnosis
- ❖ Medical Nutrition Therapy
- ❖ Urine Ketone Testing
- ❖ Blood Glucose Monitoring
- ❖ Insulin Management
- ❖ Antepartum Surveillance
- ❖ Intrapartum / Delivery Management
- ❖ Postpartum Follow-Up
- ❖ Pre-existing Diabetes Mellitus
- ❖ Components of Gestational Diabetes Education
- ❖ Gestational Nutrition Guidelines
- ❖ Dietary Preparation for 3 hour 100g Oral Glucose Test
- ❖ Blood Glucose Log
- ❖ Bibliography

Screening

Universal screening is recommended at 24-28 weeks gestation.¹

- ❖ The recommended screening test for GDM is a 1 hour 50 g glucose challenge test (GCT) in non-fasting state. The test is positive if serum/plasma glucose is ≥ 130 mg/dl.²
- ❖ If screen is positive then diagnostic 100 g 3 hour oral glucose tolerance test (OGTT) is indicated.
- ❖ Early screening at the first prenatal visit is indicated for patients with the following risk factors:³
 - Obesity (body mass index > 28)
 - Age > 40 years
 - History of GDM requiring insulin, or history of abnormal glucose intolerance
 - Diabetes in first-degree relative
 - Polycystic Ovarian Syndrome (PCOS)
 - Ethnic groups with high rates of type 2 diabetes (DM) such as Hispanic, American Indian, African American/Black, Asian American, and Pacific Islander.
- ❖ Rescreen patients with above risk factors at 24-28 weeks gestation if early 50 g OGCT screen is negative.
- ❖ Rescreen patients in the third trimester based on clinical suspicion; for example, presence of macrosomia or polyhydramnios.
- ❖ Patients diagnosed with GDM by early screening may have had undiagnosed pre-existing DM and may be candidates for further evaluations not required for GDM (ultrasound fetal structural survey, fetal echocardiography, etc).

¹ Although selective screening has been investigated in study protocols, the process is too cumbersome to be easily applied in daily practice raising concerns that under diagnosis of GDM may result. *New England Journal of Medicine* 1997;337:1591-6

² The choice to use 130 rather than 140 as the cut off value will increase the correct diagnosis of GDM by 10% but also will increase the number of patients requiring a 3 hour OGTT from 15 to 25%. Providers should choose which cut off value to use based on GDM prevalence in their patient population and testing costs. *Clinical Diabetes* 1998; 16(1):4-11.

³ Recommendations for early screening are not standard. *Clinical Practice Recommendation, American Diabetes Association* 2003.



Diagnosis

- ❖ 1 hour 50 g GCT > 200 mg/dl may be used as an indication to treat for GDM without further testing because it highly correlates with a positive 3 hour 100 g OGTT.⁴
- ❖ The definitive test for GDM is a 3 hour 100 g OGTT in a fasting state after a 3 day carbohydrate loading diet.
- ❖ Use Carpenter and Coustan's standards for the 3 hour 100 g OGTT. Abnormal serum/plasma glucose values follow.⁵

3 Hour 100g OGTT

Time	mg/dl
fasting	≥ 95
1 hour	≥ 180
2 hour	≥ 155
3 hour	≥ 140

- ❖ Two or more elevated values define GDM.
- ❖ If one elevated value, recommend exercise and nutrition counseling and either repeat 3 hour 100 g OGTT in one month or perform periodic glucose monitoring.⁶
- ❖ 30% of patients with one abnormal value on the 3 hour 100 g OGTT will be diagnosed with GDM if retested in 4 weeks.
- ❖ All patients with a new diagnosis of GDM should have diabetes education. (See enclosed Gestational Diabetes Care Components).

⁴ Studies show 90% of patients with a 1 hour 50 gram OGCT >200 mg/dl will meet the criteria for the diagnosis of GDM. *Obstetrics and Gynecology* 1996;87:395-400.

⁵ Carpenter and Coustan's values are a more accurate conversion of O'Sullivan's original results than the values recommended by the National Diabetes Data Group (NDDG) in 1979. Several studies show that patients diagnosed as GDM by Carpenter and Coustan's standards are at the same risk for obstetrical complications as patients diagnosed by the National Diabetes Data Group's standards. *American Journal of Obstetrics and Gynecology* 1989;161: 638-41. *MNT Evidence Based Guides for Practice*, American Dietetic Association 2002

⁶ Because there have been reports of adverse outcomes in pregnant patients with impaired glucose tolerance not diagnostic of GDM based on NDDG standards, patients with one abnormal value on Carpenter and Coustan's standards need follow up.

Medical Nutrition Therapy

Dietary Recommendations

- ❖ The diagnosis of GDM or 1 abnormal value on a 3 hour 100 g OGTT requires the patient to see a Registered Dietitian (RD) for Medical Nutrition Therapy (MNT).
- ❖ Preprinted meal plans are inadequate for long term management, but can be used in the interval between diagnosis and the patient's appointment with the RD for MNT.
- ❖ Some patients will require follow-up nutrition counseling visits. Adjustments may be needed during pregnancy based on clinical factors such as weight loss, hunger, abnormal fetal growth, and ketonuria.
- ❖ The nutrition consultation should include an individualized nutrition assessment based on the patient's culture, food preferences, lifestyle, and home glucose monitoring results.
- ❖ Specific recommendation for caloric intake*:

Prepregnancy Body Mass Index	Kcal/kg/day	Kcal/lb/day
BMI of 19.8-26.0	30	13.6
BMI of 26.1-29.0	24	10.9
BMI of greater than 29.0	18	8.2
BMI of less than 19.8	36-40	16.3-18.2

* These recommendations are based on calorie requirements for optimal weight gain and for prevention of starvation ketosis during the 2nd and 3rd trimester and may need to be adjusted based on individual activity level.

- ❖ Specific recommendations for weight gain:

Weight status	Desired weight gain
Underweight (<19.8 BMI)	28-40 lbs
Average (19.8-26 BMI)	25-35 lbs
Overweight (26-29 BMI)	15-25 lbs
Obese (BMI ≥ 26.0)	15 lbs
Twin gestation	35-45 lbs
Triplet gestation	45-55 lbs

American Dietetic Association, 2002

- ❖ Efforts to lose weight should be discouraged.



Urine Ketone Testing

- ❖ Ketone testing is an important part of monitoring in gestational diabetes.⁷
- ❖ Consider urine ketone testing if:
 - Patient is obese (≥ 26 BMI)
 - Patient experiences weight loss
 - Insulin is initiated
 - Patient has other illnesses
- ❖ Significance of ketonuria needs to take into consideration, since a number of patients will have ketonuria because of normal pregnancy physiology.
- ❖ Discontinue ketone testing if all results are trace or less.
- ❖ Moderate or higher ketones reflect inadequate calories (“starvation ketosis”) NOT diabetic ketoacidosis.
- ❖ If results are frequently positive then a referral to an RD for MNT should be considered even if increased calories require initiation of insulin to achieve euglycemia.

⁷ *Diabetes Care, American Diabetes Association, 26:S106-S10 8,2003*

Blood Glucose Monitoring

- ❖ All patients with GDM should do home glucose monitoring with fingerstick blood glucose. A blood glucose meter with memory is ideal. (Hemoglobin A1C may be useful, but normal results may be falsely reassuring)⁸
- ❖ Check fingerstick blood glucose levels (FSBS) 4 times per day (fasting and 1 or 2 hour postprandial) for 1 week.

Optimal fingerstick blood glucose values	
Time	mg/dl
Fasting	<95
1 hour postprandial	<130
2 hour postprandial	<120

- ❖ Decrease testing to 2 days per week (4 times per day), after one week if all values are optimal.
- ❖ Resume or continue daily testing 4 times per day if there are any values above optimal range.
- ❖ If insulin is required resume daily testing 4 times per day (more often if clinically indicated).

⁸ Normal A1C values during pregnancy have not been standardized by most clinical laboratories. Normal glycemia in pregnancy is 20% lower than in non-pregnant state. Therefore, normal A1C in pregnancy will also be lower. *American Journal of Obstetrics and Gynecology*, 1989, 161; 415.

Insulin Management

- ❖ Allow up to one week for blood glucose to optimize in response to MNT before using insulin.
- ❖ Consider starting insulin if more than 2 elevated blood glucoses within one week (fasting and/or 2 hour postprandial). Example regimen: 0.4 u/kg day based on current weight.⁹
- ❖ Always use non-animal (minimally antigenic) insulin.¹⁰
- ❖ Many patients with isolated elevated fasting blood sugars do well with NPH at bedtime.
- ❖ Patients with postprandial hyperglycemia can often be treated with a single injection of mixed insulin daily.
- ❖ Multiple injections may be required.
- ❖ Base insulin adjustments on home glucose monitoring results.
- ❖ The patient should report results of daily home glucose monitoring at least 2-3 times per week during the insulin initiation period and then at least weekly when normalized.
- ❖ Instruct patient to call physician or diabetes educator if there are 3 abnormal results between scheduled follow up visits.
- ❖ If patient is not achieving euglycemia within two weeks of initiation of insulin therapy, then consultation with a physician with additional expertise in managing insulin in pregnant patients is encouraged.

⁹ *Staged Diabetes Management* decisionpath for GDM, International Diabetes Center, Minneapolis, MN.

¹⁰ Data has been published on the use of insulin lispro (Humalog) for women with GDM concluding that it can be considered a therapeutic option. *Endocrine Practice* 2000; 6(1) 98-100.



Antepartum Surveillance

- ❖ Initiate daily fetal movement determinations (“kick counts”) at 28 weeks in all patients with GDM.
- ❖ Antepartum surveillance includes a twice weekly nonstress test (NST) **or** a weekly Biophysical Profile or Contraction Stress Test.
 - If euglycemic with diet only, then initiation of antepartum testing may be delayed until 40 weeks.
 - If insulin is not required, but euglycemia has not been documented, then initiate antepartum testing at 36 weeks.
 - If insulin therapy is required, then initiate antenatal testing at 32-34 weeks.

Intrapartum/Delivery Management

- ❖ All patients should have a clinical or ultrasound estimate fetal weight (EFW) within 2 weeks of estimated delivery date. Decisions regarding route of delivery need to involve appropriate counseling regarding risks and consequences of shoulder dystocia as well as risks associated with cesarean delivery.¹¹
 - If EFW > 4500 grams, then delivery by cesarean section without a trial labor is reasonable.
 - If EFW 4000-4500 grams, then clinical pelvimetry, obstetrical history, and fetal growth pattern should be used to counsel the patient regarding trial of labor.
 - If EFW < 4000 grams, then the patients should be managed according to standard obstetric practice.
- ❖ Monitor fingerstick blood glucose (FSBG) every 1 to 2 hours in labor with the goal of maintaining whole blood glucose levels between 70 and 100 mg/dl.
- ❖ If labor is anticipated to exceed 6 hours duration, then maintenance intravenous fluids containing 5% dextrose should be initiated. Bolus fluids should not contain glucose.
- ❖ Initiate an insulin drip during labor if FSBGs are > 120. If they are between 100 and 120 mg/dl, then the decision to initiate an insulin drip will depend on the expected time interval to delivery; the longer the interval the more beneficial the use of an insulin drip.
- ❖ This is one of many insulin drip regimens. Mix 25 units of regular human insulin in 250cc of normal saline (concentration 1 unit /10 cc Normal Saline). Initiate infusion at 10 cc/hour (1 unit insulin/hour). Adjust rate hourly based on hourly FSBS results. If patient has been requiring large doses of insulin to achieve euglycemia antenatally, a higher initial infusion rate may be appropriate. Consultation is recommended if the primary obstetrical provider is not prepared to manage an intrapartum insulin drip.
- ❖ **Each institution should have a consistent protocol for intrapartum glucose monitoring and insulin use.**

¹¹ An excellent video tape, Shoulder Dytocia Drill by Bill Young is available through the American College of Obstetricians and Gynecologist by calling 1-800-762-2264.



Postpartum Follow-up

- ❖ Discontinue insulin therapy after delivery.
- ❖ Obtain a casual (random) blood glucose on postpartum day 1-3; if this is normal (<200 mg/dl), then blood glucose monitoring is not required during the postpartum period.
- ❖ Obtain a 2 hour 75 g OGTT 6 to 8 weeks postpartum if:
 - patient required insulin during pregnancy
 - patient diagnosed with GDM prior to 24 weeks gestation
 - patient had a value >200 mg/dl on the 1 hour 50 g GCT
 - patient had a fasting result of >95mg/dl on the 3 hour 100 g OGTT

2 hour 75 gram GCT		
Any single abnormal value is diagnostic.	Serum/Plasma Glucose Values for Diagnosis of Pre-Diabetes (mg/dl)	Serum/Plasma Values for Diagnosis of Type 2 Diabetes (mg/dl)
Fasting	110-125	≥ 126
1 hour		≥ 200
2 hour	140-199	≥ 200

- ❖ Alternatively, these patients can be tested with a casual or fasting serum/ plasma glucose; however, the result will not be as sensitive.

Casual or fasting serum/plasma glucose		
Any single abnormal value is diagnostic.	Serum/Plasma Glucose Values for Diagnosis of Pre-diabetes.	Serum/Plasma Glucose Values for Diagnosis of Type 2 Diabetes (mg/dl)
Fasting	110-125	≥ 126
Casual		≥ 200

- ❖ Refer patients diagnosed with Pre-diabetes, Type 2 DM, or Impaired Fasting Glucose to a primary care provider.
- ❖ Fasting blood glucose should be obtained annually on all patients with history of GDM. Communicating this to patients and primary care providers is important.
- ❖ All patients with GDM should be strongly encouraged to have a consultation with a diabetes educator and Diabetes Education following discharge regarding the long-term implication of a history of GDM.¹²

¹² The diagnostic criteria for GDM was developed based on the diagnosis being a predictor of subsequent development of type 2 DM. Therefore, the patient needs to understand the future of this diagnosis. Given the immediate focus of patients on the pregnancy prior to delivery, this counseling is best provided in the postpartum period.

Pre-existing Diabetes Mellitus

- ❖ It is beyond the scope of this document to cover management of pre-existing Type 1 or Type 2 Diabetes Mellitus during pregnancy.
- ❖ Because patients with a history of GDM are at risk of developing Type 2 DM, the following points emphasize the importance of appropriate postpartum counseling and follow-up after a GDM pregnancy.
 - Preconception euglycemia decreases the risk of both miscarriage and congenital anomalies in patients with DM to levels equal to that of normal patients. **Therefore documentation of euglycemia by hemoglobin A1C and/or home monitoring in the 3 to 6 months prior to conception is recommended.**
 - Diabetes and its co-existing medical complications may result in adverse maternal medical and obstetrical outcomes. **Therefore, all women with diabetes should have preconception counseling which addresses both obstetrical and medical considerations.**

Components of Gestational Diabetes Education Consultations

NEW DIAGNOSIS OF GDM

Overview of gestational diabetes/effects on mother and child

- Discuss blood glucose monitoring
- Discuss proper lancet disposal
- Discuss urine ketone testing
- Recommend practice saline injection
- Discuss exercise, as appropriate
- Provide education materials as needed
- Review (or refer to RD) MNT

Insulin Initiation

- Discuss the need for euglycemia in pregnancy
- Review type, action and peak of insulins
- Emphasize non-animal (minimally antigenic) source of insulin only
- Review injection site selection and rotation
- Review saline injection(s)
- Review storage of insulin
- Review meal plan and its relationship to timing of insulin injections
- Discuss proper syringe disposal
- Discuss symptoms and treatment of hypoglycemia
- Provide educational materials as needed
- Refer to RD for more intensive MNT

Components of Postpartum Follow up Diabetes Education

- Review results of (or refer for) postpartum glucose tolerance test when indicated
- Establish weight goals
- Establish specific exercise program
- Educate regarding increased lifetime risk for type 2 , cardiovascular risk, and dislipidemia
- Educate regarding the increasing risk of developing type 2 diabetes with each subsequent pregnancy
- Recommend annual fasting blood glucose
- Recommend pre-pregnancy counseling/explain pregnancy complications associated with hyperglycemia
- Provide educational materials as needed



Gestational Nutrition Guidelines

This type of diabetes appears for the first time during pregnancy. It occurs in 1 to 14% of all pregnancies. Gestational diabetes is usually found in the 5th to 6th month of pregnancy. Gestational diabetes may occur because hormones produced by the placenta in all pregnant women make insulin less effective. These hormones increase as pregnancy progresses.

All women with Gestational Diabetes should be testing FBS and 2 hour pp blood sugars. Target blood sugars for pregnancy: Fasting < 95 and 2 hour post meal blood sugars < 120.

Breakfast:

Due to hormones made by the placenta that are released during the night, blood glucose levels may be especially elevated following breakfast. Try the following suggestions to keep blood sugar levels within a normal range after breakfast:

1. Avoid fruits and fruit juice at breakfast
2. Carbohydrate foods such as cereals, large bagels, and sweet rolls should usually be avoided.
3. Limit carbohydrate at breakfast to 2 choices or 30 grams total.

Meal Plan:

It is important to include all of the basic food types, including starches in your meal plan. The meal plan that you get from your dietitian will help you balance your meals, especially the amount of starches that you need, throughout the day.

Exercise:

If you have difficulty achieving the blood sugar goal after meals, exercise - a walk can often help lower blood sugars. You will need to meet with your dietitian diabetes educator to help develop a meal plan to be certain that adequate weight is gained during pregnancy and to keep your blood sugars within the target range.

Goals of the Meal Plan:

Adequate calories for both you and your baby
Blood sugar levels within target zone (<95 fasting and <120 2 hours after meals)
Slow and gradual weight gain of 24-30 pounds during pregnancy (If you were overweight before, you may need to gain less but this is NOT a time for weight loss!)
Bring in a food record to discuss with the dietitian. Limit caffeine to <300 mg/day

Frequent phone contact will help your diabetes educator evaluate your blood sugars.

Call your Diabetes Educator on: _____

Carbohydrate Choices

AMOUNT	FOOD ITEM	STARCH	FRUIT	MILK	CHOICE
2 oz	Bagel	2			2
½ cup	Orange Juice		1		1
1 cup	Milk			1	1
1 cup	Mashed Potatoes	2			2
8 oz	Artificially-sweetened yogurt			1	1
1 large	Banana		2		2

Combination Foods – Exchange Value Available

1 cup	Potato Salad	2			2
1 each	Ice Cream Bar	1			1
2 cups	Spaghetti and Meatballs	4			4
8 oz	Nonfat Vanilla Yogurt			1	1

Combination Foods – Exchange Value Not Available

16	Cheese tidbits = 8 gm CHO				½
1 each	Oreo Big Stuff® cookie = 33 gm CHO				2
8 oz	Stouffers Vegetable Lasagna® = 28 gm CHO				2
1 each	Big Mac® = 43 gm CHO				3

Carbohydrate Containing Foods

Food Group	Food
Starch	Bread: Bagels, English muffins, rolls, pancakes, tortillas, Naan, bread sticks, crackers, popcorn, and pita bread Pasta: noodles, spaghetti, and macaroni Cereal: dry or cooked Legumes: lentils, dried beans, garbanzo, pinto, kidney, black-eyed, white, split, lima beans, and miso
Fruit	Apples, oranges, bananas, and all fruit – fresh, frozen, canned, or juiced (sweetened or unsweetened)
Milk	All milk (fat-free, low- or reduced -fat, and whole, Goat's, and soy) Yogurt (plain or artificially sweetened)
Vegetable	Carrots, green beans, broccoli, greens, and all other crunchy vegetables (only if 1 ½ cups or more)
Other	Foods that include any of the above items, such as: <ul style="list-style-type: none"> ▪ Casseroles (lasagna, tuna casserole, mac & cheese) ▪ Soups (bean, chicken, vegetable beef, cream) ▪ Stews (pot pie, beef) ▪ Snack foods – chips, pretzels, and French fries, pizza ▪ Desserts – ice cream, frozen yogurt, cake, cookies, pie

*Exchange Lists for Meal Planning, American Dietetic Association, 2003



Caffeine Content of Beverages

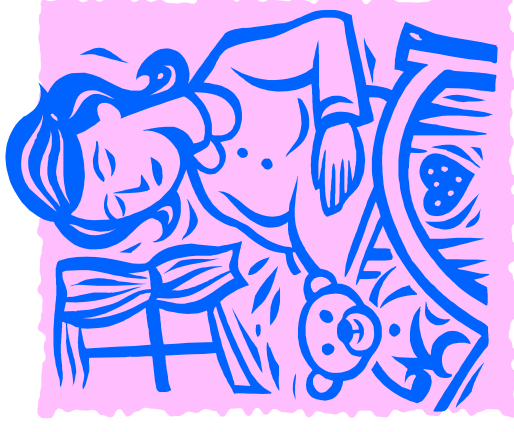
-according to the National Soft Drink Association

Milligrams per 12 oz of soda		
Jolt.....	71.2	Mello Yellow.....52.8
Mountain Dew.....	54.0	Coca-Cola.....45.6
Diet Cola.....	45.6	Shasta Cola.....44.4
Shasta Cherry Cola.....	44.4	Shasta Diet Cola.....44.4
Mr. Pibb.....	40.8	Dr. Pepper.....39.6
Pepsi Cola.....	38.4	Diet Rite.....36.0
Diet Pepsi.....	36.0	RC Cola.....36.0
7-Up.....	0	Diet 7-Up.....0

Milligrams per 7 oz cup of coffee		
Drip.....	115-175	Espresso (1.5-2 oz).....100
Brewed.....	80-135	Instant.....65-100
Decaf / brewed.....	3 - 4	Decaf, instant.....trace
Tea, iced (12 oz).....	70	Tea, brewed imported.....60
Tea, brewed.....	40	Tea, instant.....30

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Gestational Diabetes



Nutrition Guidelines

Diabetes Educator: _____

Phone Number: _____

3 Day Dietary Preparation

for 3 hour 100 g Oral Glucose Tolerance Test

Getting Ready

- ❖ It is important that you eat at least three meals a day starting three days before the test. The meals should contain lots of starches (carbohydrate foods, such as bread, cereal, pasta, grains, rice, beans, starchy vegetables, potatoes, corn, peas, fruit and fruit juice, milk, yogurt, sweets...)
- ❖ Three days before the test, you must also eat/drink extra carbohydrate calories. Each day, eat 1 of the following in addition to your regular meals:
 - 2 slices of bread
 - 1 piece of cake
 - 1 candy bar
 - 1 can non-diet soda
 - Other food equivalent to 30g carbohydrate

The Night Before Your Test

- ❖ After midnight the night before your scheduled test, do not eat or drink anything besides water.
- ❖ Do not smoke, chew gum and eat cough drops or candy, or take iron or vitamin pills.

The Test

- ❖ In the morning when you come to your appointment a blood sample will be taken (fasting blood glucose) and then you will be asked to drink a cold sweet drink (Glucola 100 g).
- ❖ Blood samples will then be taken at one hour, two hours, and three hours after you finish the sweet drink. During the test, you are not allowed to eat or drink anything except water.
- ❖ You may bring a snack to eat after the test is completed.

Please follow the instructions above carefully. It is very important not to “diet” before the test as dieting may cause false results.



Log Sheet

Name: _____ (H) _____ ft/in (W) _____ lbs
 Prepregnancy weight: _____

Blood Glucose Tests

Date/Day	Ketones	Fasting BG	Breakfast 1 or 2 hr post	Lunch Before 1 or 2 hr post	Dinner Before 1 or 2 hr post	HS	Insulin	Comments
Mon								
Tues								
Wed								
Thurs								
Fri								
Sat								
Sun								
Mon								
Tues								
Wed								
Thurs								
Fri								
Sat								
Sun								
Mon								
Tues								
Wed								
Thurs								
Fri								
Sat								
Sun								

Gestational Diabetes Guidelines

Fasting < 95 mg/dl

Before meals 90-100 mg/dl

1 hour after meals <130 mg/dl

2 hours after meals <120 mg/dl

Special Instructions

How often to test for ketones _____

How often to test blood glucose _____

Date _____



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